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Beeswax,

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Beesswax

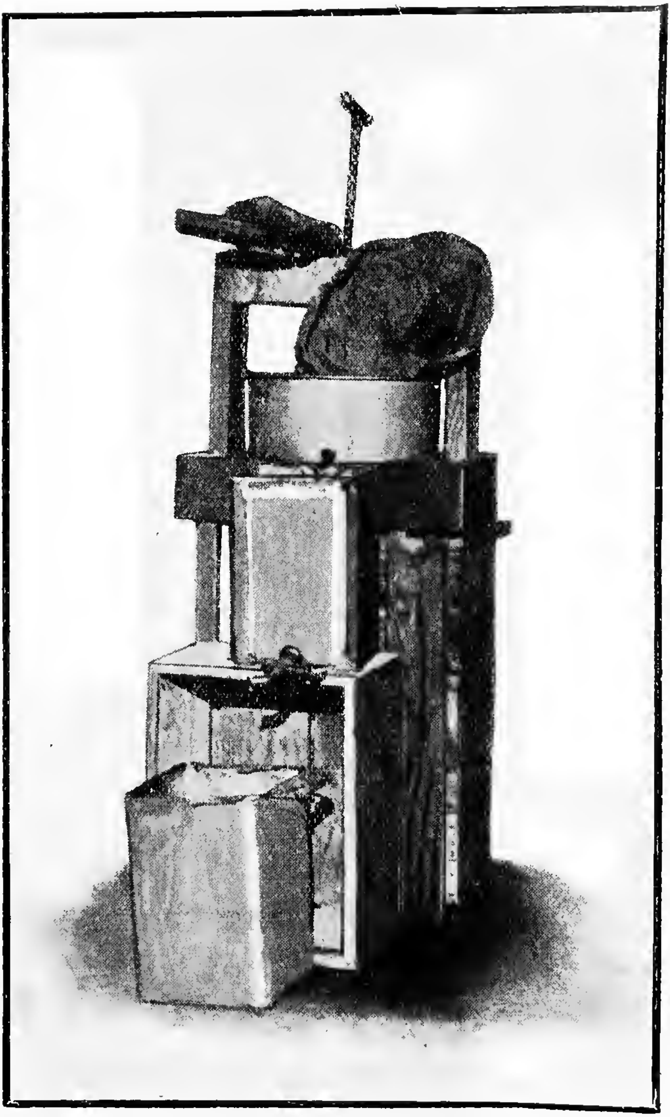
By

W. B. Bray

Price 6d.

CHRISTCHURCH, N.Z.

Printed by The Lyttelton Times Company, Limited.
1920



Hatch Press Ready for Use.

Beeswax

Beeswax is perhaps one of the oldest articles of commerce. As far back as history reaches we read of beeswax being used in the arts and crafts. In modern times many new uses have been found for it, and although mineral and other insect and vegetable waxes have been found to take the place of beeswax in many cases, the latter is still in greater demand than ever. The steady increase in modern beefarming and the use of better appliances in saving the wax are leading to a continued increase in production. But side by side with this increase is the growing use by beefarmers of wax in the form of comb foundation, and thus it happens that the producer is his own best customer. Beeswax will always be in good demand the world over, and although its production is of secondary importance in beekeeping, its value is such that it is well worth while learning how to save the most in the best manner possible. From my long experience in handling other beekeepers' wax I am convinced that there is room for considerable improvement in both the quantity and quality of wax produced by the average beekeeper. Lack of the proper appliances or lack of knowledge of how to use them, or perhaps both reasons, lead to the loss of much good wax and the dirty state of much that is saved. It is my purpose in these few pages to give to beekeepers the result of my experience in handling and saving beeswax. There are many methods of rendering wax from old combs, but I am convinced that the average beekeeper is not interested in them all, but rather prefers the plan which has been tried out thoroughly by others and found simple and effective. While I do not claim originality for my methods, I do believe they will fill all the requirements of the beekeeper.

A few preliminary remarks on the origin and the nature of bees wax will not be out of place here.

The worker bees produce wax from four pairs of glands situated between the segments of the abdomen on the under side. The bees hang together in clusters to keep up the necessary temperature for the secretion of wax, and as they have to consume a large quantity of honey for the same purpose, the production of wax takes place usually when a flow of honey is on. It is usually accepted as being near the mark in saying that it requires from ten to twelve pounds of honey for the production of one pound of wax. The wax comes from the glands in the form of very small white scales. When a big swarm begins work these scales are produced in such abundance that they can be easily seen on the floor board. The secretion of wax is voluntary, but it might be said that during a heavy honey flow it becomes involuntary. At such times and especially if the bees are well provided with drawn-out combs, they seem to plaster every available space with thick brace and burr combs. Then is the time to get new combs built, as the cost of production, reckoned in honey consumed, is much less than at any other time. New comb appears to be white in colour, but when melted into a solid lump it is of a pale lemon colour. Comb used in successive seasons for storing honey and pollen becomes a deeper shade of yellow. Comb that is used for brood rearing gradually becomes darker with age. Each generation of brood spins a cocoon thicker at the base than at the sides. These cocoons remain in the cells and give the comb the dark appearance. A fine webbing is also spun under the capping, which, in the first generation in a new swarm, is composed of pure wax put loosely together so that it is porous. When ready to emerge, the young bee gnaws off the capping, which is used again and again to seal up the following generations of brood, and becomes darker with age. Honey is usually sealed with cappings of pure wax, but in old colonies close to the brood nest a good deal of the old brood cappings is used with the wax, and it is the presence of the cocoon spinnings in such cappings that gives the fine refuse when rendering them.

In the brood combs it is the successive layers of cocoons that give the trouble in extracting the wax. Pollen in the combs is a greater source of trouble, and if the amount be excessive and time is no object, it is not a bad plan to store the combs until mites get in and consume the pollen, when it can be shaken out like dust. Nearly every beekeeper has at some time noticed that a pollen-clogged comb that has been out of use for a time is full of a loose dust, yet perhaps he did not suspect that the dust was alive. A close examination shows the presence of mites.

Bees gather a certain amount of a glue-like substance called propolis, with which they seal up cracks and holes. It is a gum found on the growing shoots of trees where it protects the tender growth from the danger of frosts. Its character varies according to the variety of tree it comes from. For instance the ngaio tree yields a dark red brown, or apparently black propolis. This is practically the only propolis found on Banks Peninsula, where the ngaio is fairly plentiful. The poplars yield a yellow propolis, which in cold weather is so strong that it is almost impossible to move the frames in a hive. In hot weather it clings to the hands like seccotine. The ngaio propolis is not nearly so tenacious.

The reason that I have referred to propolis is that it to a great extent affects the colour and the aroma of the wax. A small amount of it gets plastered on old combs, and more on the frames, so that a fair amount of it gets rendered with the combs. Again where beekeepers use cloth mats on top of their frames there is always a ridge of propolis where the mat touches the frame. Why they do it I cannot say, but a good many beekeepers will, when uncapping, scrape all this propolis into the cappings. It is of no use in the wax, as it has eventually to be separated, and thrown away while the bees set out to gather more. But while in contact with the wax under heat, the propolis stains it and imparts an aroma. The ngaio propolis gives the wax a red-brown colour and a slight aroma, while that from poplar gives more yellow and an unmistakable aroma.

Another distinct colour which I have come across is a green shade of yellow. As yet I do not know the source of the propolis which is probably the cause of this colour. Wax from a flax district has a strong flax aroma. Its colour is a rich red-brown. I should think that both colour and aroma in this case are derived from propolis gathered from the flax.

Colour and aroma in wax are variable qualities, and cannot be controlled beyond certain limits. As I have already pointed out, propolis affects both. In rendering brood combs it is not possible to eliminate all the propolis. With cappings there is no difficulty. But honey also affects both the colour and the aroma. It is more noticeable in dealing with strong flavoured and dark honeys. Cappings wax from a pohutukawa crop is light coloured, but has a distinct flavour of pohutukawa. Other instances are pennyroyal and manuka which can easily be recognised by the aroma, the colours also being distinctive.

In setting a standard for grading wax I would not take much notice of either colour or aroma except where an unnatural variation is found, such as, say, a dark colour through burning, or a rotten smell due to combs being left in water till it putrifies. The most important point to consider is the cleanliness of the sample. Most beekeepers fail in getting their wax absolutely free from all dirt. It is not a matter of impossibility, but just a question of knowing how. On the show bench the lightest colour usually gets first prize, lightness of colour being as important there as cleanliness. But for ordinary commercial purposes the natural colour, whatever it be, is all that is required.

Beeswax is a solid, semi-transparent substance. When cold it is hard and brittle, and it breaks with a rough grain. The smooth surface, when rubbed vigorously with the finger, is not greasy, but it grips the finger and causes a squeaking noise. At I08deg. F., beeswax becomes ductile and can be kneaded into any shape. At between I20deg. and I30deg. it lightens in colour and becomes too soft to handle. At I43deg. to 145deg. it becomes liquid. At the temperature of boiling water, 212deg., it is nearly boiling and bubbles begin to rise in it. Its boiling point is a little higher, but it is a very risky practice to melt wax without a hot water or steam jacket to prevent it reaching its own boiling point, as when it boils it froths up very quickly. It is extremely dangerous to have it boil over, as it is then in a highly inflammable state. Not only is a dry heat unsafe, but it also darkens the wax considerably, and makes it more brittle. Excessive dry heat burns it to a dark brown. Beeswax expands considerably under heat, the increase in volume between 60deg. and I45deg. being roughly four per cent. The aroma is not very pronounced until the wax is melted.

Hard water saponifies beeswax. The lime in the water combines with the wax and forms a greyish porous compound, which appears at the bottom of the cake of wax as waste. Much wax is needlessly lost through the use of hard water. Indeed I have known of a case where a beekeeper should have obtained 18 to 20lbs. of wax from the amount of comb he rendered, but the actual result was less than half a pound. He had used water from a well in which he had lately put half a bag of lime. Practically all artesian and river waters are more or less hard, and even rain water stored in a concrete reservoir is affected. Nothing but the purest rain water should be used in contact with wax. Where it is not procurable vinegar should be added to the water used. Ordinary artesian water slightly hard requires about a pint to ten gallons. By taking care over this simple matter more wax is saved and the sample is much cleaner.

There are three classes of material to deal with in obtaining wax—burr or brace comb, cappings and combs. The first accumulates during the season, and can be rendered with the combs. In a large apiary a solar wax extractor is a great convenience as it deals with the burr comb from day to day. In northern climates where the wax moth is very difficult to get rid of, a solar extractor is almost a necessity. A word of caution is necessary here. Where disease is present in an apiary it is not advisable to use a solar, as it may be the means of spreading disease further. In any case the extractor must be bee tight to prevent robbing, but there is always the risk of its being blown over or left open.

The construction of the solar is so simple that the average person handy with tools can make one, especially if the double glass frame is obtained from a sash-maker. Any supply catalogue will give a good idea of the construction of the machine, so there is no need for details here. Suffice it to say that the tray can be made of ordinary tin sheeting. I have found that as good a heat can be obtained on a reflecting surface as on an absorbent surface such as black iron, which is usually recommended for these machines.

Cappings are more difficult to deal with on account of the honey adhering. For a small amount of cappings a good plan is to drain them thoroughly, then wash them well in water and drain again. The washing water can be used to make a small cask of vinegar. A No. 1 Twaddell's hydrometer is necessary for testing the strength of the liquor. It should float at the 12 mark. The washed cappings can then be melted in clean water and strained or pressed.

Many beekeepers who have a large quantity to deal with, are now using one of the various capping melters on the market. In my opinion there are several objections to them. The heat that has to be applied makes it very uncomfortable for the operator. It also slightly darkens a large quantity of honey, but this is not so noticeable when the honey is put in the tank and mixed with the bulk. Time is required to get heat up, which is a drawback for out apiary work. I prefer to uncap over a Dadant uncapping can. It is conveniently handled, holds a fair day's cappings, and allows the bulk of the honey to drain. By using two cans the cappings can be drained fairly well. For a few years I have put the drained cappings away till enough accumulated to give me one or two days' work with a capping melter. Above the lip which delivers the honey from the separator can I put another lip to deliver the melted wax. By means of this I can get the bulk of the wax off quite clean and free from honey. The wax which cools on top of the honey at the end of the day contains a certain amount of slumgum, so I put it away till the end of the season and deal with it then, as for combs.

Combs are the most troublesome to deal with, and the longer they have been in use for brood rearing the more trouble they give. There is really only one method which is satisfactory. It is the application of pressure under hot water, by means of a Hatch press. This machine is very simply and strongly constructed, and it should last a lifetime. Though not expensive it is the best and most conveniently operated press that has been devised for the purpose. It will pay for itself in the extra wax it obtains from brood combs, over any non-pressure method, by the time it has put through 70 to 80lbs. of wax. No beekeeper, therefore, can afford to do without one if he has old brood combs to render down.

The equipment required, besides the Hatch press, consists of a large copper boiler, a dipper, a few sound sugar bags, a can with a tap at the bottom, and a number of clean benzine tins. The last-named should have the tops removed half an inch below to allow the blocks of wax to slip out easily. The sugar bags have the seam on one side cut open about a third of the way down. Only a copper boiler, or tins, should be used to boil the wax in. Iron turns the wax brown or almost black, and galvanised iron turns it a dark green-brown. I prefer to cut the combs out of the frames beforehand, rather than melt them off in the boiler, which is a messy job. I scrape the frames clean with a dull knife. Comb rendering always makes a suitable job for a wet day. It should be done within doors for two reasons. Quicker and better work can be done in a warm room, and the bees give no trouble. Especially if there is any diseased comb being handled it is important to keep clear of the bees, as the danger of re-infection is very great. A washhouse with the boiler inside is a very handy place, and by taking ordinary care it can be left as clean as it is found. For quick work and clean results a good fire and a warm room are essential.

The press should be placed on a bench at least 30 inches above the floor, and fastened to the bench with hinges in front, so that it can be tipped forward safely. The can with the tap is placed in front on a box high enough to allow a tin to stand under the tap. The procedure is as follows—Fill the boiler with clean soft water, and get a good fire going. While the water is coming to the boil get everything set ready in its place. Plug the spout of the press with a cork, and put a sugar-bag between the cleated followers. These should be set in the can so that the cleats run toward the outlet—the bottom one cleats upwards and the top one cleats downwards. Fill the can with boiling water, and put the first lot of comb into the boiler. If the combs are very old six or seven are sufficient at one time, while for combs that have been bred in for one or two seasons only the number can be increased to ten or eleven. The main thing is not to press too much slum-gum at a time. The rule is little and often. Keep the water boiling, and stir the comb until it is thoroughly broken up. Now dip the stuff into a tin, taking plenty of water with it so that the tin is about three parts full of water and comb. Then put the next lot of comb into the boiler to get ready for the next pressing. Remove the cork from the outlet of the press, and let the water run into the upper tin. Pull the can forward slightly, and remove the iron foot and the upper follower. (The foot is made to fasten on the end of the screw, but is in the way unless the can is lifted right out each time, so it is easier to have the foot loose, and remove it). Spread out the sugar-bag with one ear hitched over the right-hand corner of the cross arm. The reason for splitting the bag will now be evident. Take up the tin of melted comb, resting the bottom on the right forearm, hold the other ear of the bag in the left hand and, dropping one corner of the tin in the spilt seam, pour the contents quickly into the bag. Then make two folds in the seam and the same at the top of the bag. Place the follower on quickly so that the folds are held firm. Push the can back into its position under the screw, and push the follower down by hand until the iron foot can be got under the screw. Then apply the pressure, but not too fast—just taking it down easy a few turns at a time till most of the liquid has run out. Then the pressure can be put on harder, still doing a turn or two at a time. Tilt the press forward to drain it. What runs out last is mostly wax, and enough time and pressure must be given to get every drop squeezed out. Release the pressure, remove the follower, and, using a hive tool, shake up the bag or double it over and repeat the pressure. The main thing is to get the bag so folded that the cake gets an even pressure throughout, so that it is all squeezed dry. When finished pressing the bag will be coated with melted wax, but this is not lost—it comes away with the next lot. In between whiles the boiler can be attended to, and the next lot dipped into the tin. When ready to press the next lot, empty the bag quickly into a box by turning it inside out, and get it filled again before it gets cold. Thus the routine is followed for the day.

If the bag becomes clogged up with pollen or fine dirt that won't shake off, turn it inside out and wash it out in cold water. Dip it into hot water immediately before using it again. When the first or upper can is filled the water is drawn off by the tap at the bottom and returned to the boiler. This water is still hot and does not retard progress in the boiler. As the hot water is by this method passing through the wax can over and over again the wax is kept thoroughly hot. As the wax accumulates there is less room for water, so when the can is about two-thirds full of wax it is emptied into another tin which is set aside to cool. The wax should still be quite hot, so that it appears to be in continual motion. This lively heat is essential to get it thoroughly cleaned of all fine dirt. While cooling, the wax should be covered with several thicknesses of sacks, as the slower it cools the better chance the dirt has to settle. The object is to get the dirt to leave the wax and settle in the water. It there is not sufficient heat, or if the heat is right but escapes too quickly, the dirt will not settle below the wax, but will remain in it. By following the above directions closely it is possible to obtain a good coloured and thoroughly clean wax in the one operation from the oldest brood comb.

To judge whether all the wax is being saved, break up a piece of cold slum-gum. It should crumble to pieces easily. Examine it closely for small particles of wax. If they are few and far between, the loss is not worth mentioning. I believe that the hot water press, worked as I have directed, secures over 95 per cent. of the wax, and that what remains would not pay wages to recover.

When the blocks of wax are quite cold, they should slip out of the tins easily. There should be a clear cut line between the dirt and the wax. In cleaning the bottoms of the cakes, scrape off the rough dirt first and burn it. Scrape the last of it off so that the wax shows a clean surface, and save the scrapings to put through the solar extractor, which will recover every particle of wax, or they can be put through with the next lot of combs to be rendered.

I have advised using benzine tins to cool the wax, as besides giving more depth and less surface to collect the fine dirt, the blocks are more convenient for packing. Paper should not be wrapped round wax when packing, as it gets bruised into the wax. Sacks are very suitable for carrying wax. For safety they need to be in a new condition, and for convenience in handling the blocks should be packed tightly, and any slack in the bag sewn up. But cases are by far the best packages for shipping wax. They should be wired at each end, especially if they are sent on a sea journey. Extra nails tend rather to split the wood. It is a good plan to scratch the name and address on each cake.

It should hardly be necessary to say that where diseased combs are being dealt with, every particle of slum-gum should be burnt or buried and every drop of water buried, but it is too often the case that the beekeeper, after going to much trouble and expense in treating his bees, undoes all his work by carelessness in dealing with the infected material. A large stock of good combs is a great asset to the honey producer, and it takes some years to get a good supply on hand. It is a serious item of expense to be renewing good combs every year or so because of disease, so a beekeeper must avoid the least risk of reinfecting bis bees.

GOOD COMBS.

A few hints on procuring good combs will not be out of place here. The perfect comb should be straight, joined to the frame all round, and the cells all worker size. (Of course, in the brood chamber some drone cells must be tolerated in small patches, or the bees will tear down worker cells to build drone). To secure such a comb a full sheet of good quality foundation is necessary. The frame must be securely nailed and the wires drawn tight. I use 1½in. wire nails for the top bar instead of the 1in. supplied with the frames. If the wires are fastened with gimpins on the sides of the end bars they will come out of the holes across the grain and so remain much tighter than if they were with the grain, in which case they gradually sink into the wood. When the foundation is fastened with wedge and groove there is a great risk of the wedge warping out and letting the sheet down. To prevent this break the wedge into four or five pieces. The best combs are drawn out in the honey supers when a good flow is on as then the bees build them down to the bottom bar. Care must be taken when extracting them the first season as they are easily broken in the extractor, especially if the honey is cold. The first side should be only half emptied, then the other side can be finished before returning to complete the first side. Combs that are drawn out in the brood nest are never joined to the bottom bar. If a thin slice is cut from the lower edge and the comb placed in a super during the honey flow it will most likely be built to the bottom bar. The raw edge starts the bees building.

DISEASE NOT TRANSMITTED BY BEESWAX.

Beekeepers are often afraid that wax from diseased combs, if made into foundation, will transmit the disease. Manufacturers advertise that they put all wax through a special process to ensure the destruction of any possible disease germs. Some years ago in New Zealand doubts were cast on local made foundations. The Department of Agriculture was asked to experiment with disease infected wax. Numerous tests were carried out by shaking healthy bees on to full sheets of foundation made from wax known to have come from diseased combs. In no case did disease appear. I myself have had in use for eight years now combs built on such foundation and no foul brood has yet developed. No special process was applied to the wax under test, and I doubt if any manufacturer applies any process that can be called special. It is admitted that foul brood spores can stand the temperature of boiling water for a short time. In making foundation it is not necessary to raise the temperature of melted wax to 212deg. But there is still a factor which I have never seen mentioned yet, and it is the one which I believe accounts for the immunity of wax as a transmitter of disease. Beeswax in a melted condition is virtually an oil, and we know that oil is a destroyer of germs and spores. The reason is simple enough, and the process of destruction can hardly be called special—it is inevitable.

SHOULD SULPHURIC ACID BE USED IN BEESWAX.

In some text books on Bee-Culture the use of sulphuric acid is recommended to purify beeswax, and for years one large firm manufacturing comb foundation made a point in advertising that their wax was refined in this way. On the other hand an equally reputable firm advertised that their wax was refined without the use of injurious acids. I was curious to know whether there was any advantage in using acid, not so much in the way of safeguarding against foul brood germs, but in obtaining a better colour and cleaner sample. Accordingly I carried out some extensive tests, the result being that I decided to do without acids. I found that a lively heat, soft water, and slow cooling would remove the dirt and some of the colour stain without the addition of acid. It would probably be useful to soften the water when only hard water is procurable. But I found that there was one important objection to the use of acid. It seemed to spoil the " nature " or the " temper " of the wax, the difference becoming apparent when the wax was being worked into comb foundation. It seemed to have lost some of its toughness, which not only made it more difficult to put through the foundation mills, but reduced its quality as foundation. The firm which formerly used the acid process has evidently come to the same conclusion, as I notice that in their latest catalogues they say:—" The new process in refining does not require sulphuric acid or other injurious chemicals. . . . The new wax has the full rich aroma of natural beeswax, uncontaminated by injurious chemicals, and with all the pliableness, strength, and the other good features of virgin wax."

STEAM FOR MELTING WAX.

Steam is not so suitable for melting wax when in direct contact with the wax. The difficulty is that steam condenses when it comes in contact with the cold wax, and there is no means of re-heating it.

Even if steam from a high-pressure boiler is used, the difficulty is still there, but not so apparent; as the wax eventually appears to be all melted. In reality the liveliness of the steam causes a part of the wax to form a mechanical emulsion with the water, and this finally settles at the bottom of the wax where it is found, when cold, in the form of a grey spongy mass.

The most efficient way to melt cakes of wax with a steam jet is to use a double-walled tank and blow a steady jet of steam through the outer jacket. An opening must be provided at the bottom of the jacket to draw off the water as it condenses. Wax melted in this way can be raised to a sufficiently high temperature to get it all thoroughly melted, and boiling water can be added afterwards to carry the dirt to the bottom. Floating matter such as dead bees, straw, etc., must be skimmed off.

BA[redacted],
B[redacted],
Via [redacted]

SOLAR HEAT FOR MELTING CAPPINGS.

The beekeeper who has a large crop to handle needs some means of clearing up the cappings as he goes along. The necessity is most urgent when a heavy honey flow is on, as in order to reap the full benefit of the season, he must be able to concentrate on the actual extracting. Anything which saves time, then, increases the amount of honey extracted, and adds to the ultimate crop. A capping melter might fill the above requirements, but I believe there is a still better method. For the past season I have tried out a plan for melting drained cappings by using the heat of the sun. It has several advantages over the hot water or steam melter. There is no risk of fire, no uncomfortable heat, no continual attention and no discoloured honey. It is not so much the amount of heat in the hot water melters that darkens the honey, as it is the contact, under heat, of the honey and the slum-gum of the cappings.

I had a large solar extractor built, which differed from the ordinary in several respects. At the lower end is a compartment deep enough to allow several 60lb. tins, cut open on the side, to stand underneath the lips of the tray. The tins stand well back under the tray, so that no heat plays on them, and a hinged board in front allows them to be removed without lifting the tray. The latter has walls six inches high, the lower end being divided into several openings to deliver the honey and wax into tins. Running lengthwise of the tray, at intervals of six inches, there are V-shaped strips of tin soldered down to form ridges half an inch high. Screens of quarter inch mesh galvanised or tinned wire cloth rest on these ridges. The tray is made of heavy tinned sheeting. I used an ordinary hot bed sash frame of single thickness of glass, and it held sufficient heat to melt two days' cappings in one day.

Cappings are laid on the screens to a depth of four or five inches. Before the wax melts, the honey becomes warm enough to run. It escapes below the screen into the tins, where it is safe from further heat, which could darken it. The wax melts last and follows the honey, leaving the slum-gum on the screens. These should not be larger than 24in. by 24in., so that they can be handled easily for cleaning. The trouble of cleaning the screens is the only disadvantage I have found with this system. The only way, other than soaking in hot water, is to take them out while they are still hot and quickly give them a good shaking upside down over a large receptacle kept specially to collect this slum-gum, which is worth the trouble of putting through the Hatch press at the end of the season. If the flow is still on, so that the bees are not nosing around, the cleaning of the screens is easily done outside, but otherwise it must be done in the honey house. The filling of the tray and the emptying of the cans are conveniently done in the evening. The honey is not impaired in colour or flavour. The cakes of wax have to be drained and finally washed. If the screens are not cleared daily or at least every other day, the heated condition of the accumulated slum-gum, which is holding the honey back too long, has a tendency to stain the honey.

The extractor, which I had made, is six feet long by four feet wide, and it could handle the cappings from more than a ton of honey in one good hot day. The glass frame is somewhat cumbersome to handle, so I would advise anyone adopting this plan to use two, say, four feet long by three feet wide. The glass frame could then be made with a full sheet of glass, and if a double glass were used even better results could be obtained. The whole fixing must be absolutely bee tight or it will give more trouble than it is worth. An appliance, such as I have described, will earn its cost several times over in a season when a good honey flow arrives. The sunshine which brings the honey will keep the solar extractor working at top pressure with very little attention from the beekeeper, who will be busy enough extracting the honey so that the bees can have room to continue storing.

ALTERATION TO HATCH PRESS.

The Hatch Press as sold to-day requires a small addition to prevent the bag bulging out and blocking the outlet. The side of the can is lined with a sheet of tin holding wood slats at half-inch intervals. It is not long enough to go right round, a blank space of four or five inches being left at the outlet. Another piece of slatted tin should be joined on to complete the circle, but the new piece should be clear of the bottom by three-quarters of an inch.

Hatch Presses and other beekeeping appliances can be obtained from the New Zealand Co-operative Honey Producers' Association, Ltd., Box 1293, Auckland.

A TALK ON COMB FOUNDATION.

The fact that we are able to work beeswax into comb foundation means that the beekeeper has the advantage of a better selling market if he is selling beeswax, or else a better buying market if he is in need of comb foundation.

The wide-awake honey-producer knows that it pays to use the very best foundation. It means good, straight all worker combs which make beekeeping both pleasurable and profitable. As nothing but pure beeswax can be used in making comb foundation, it behoves every beekeeper to save every ounce of wax and have it made into foundation. We have the best manufacturing plant in New Zealand: we have had longer experience than any other maker, and our foundation is made on the principle of the Weed Process. That is the reason why we make foundation superior to any other locally made, and equal to the best imported. It is transparent and supple, and never loses its condition. It does not sag, and every sheet is perfect. We do not destroy the "temper" of the wax by using sulphuric acid to clean it. We have a better system of getting the wax perfectly clean. The result is that the bees go straight to work on the foundation, and draw it into nice straight combs. The best foundation is always the cheapest in the end.

EXTRACTS FROM LETTERS RECEIVED.

"It has exceeded my expectations. Yours is absolutely the best foundation comb I have ever used."

"We must admit it is by far the best foundation we have used that has been made in New Zealand."

"Foundation is very satisfactory."

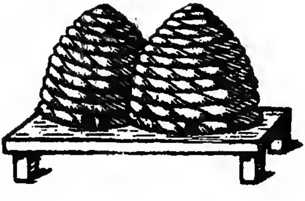
"Your foundation is of first quality, and is, in my estimation, as good as any comb sold here."

"The foundation arrived in good condition. I am more than pleased with the sample of work which you put out, which in itself is sufficient advertisement, and should put you in the forefront as foundation manufacturers."

"I think it is the best I have seen for a long time."

For prices and shipping instructions, address.

BARRETT and BRAY,
Barry's Bay, Via Christchurch.



Printed by The Lyttelton Times Co., Limited, Christchurch—46830